

SECTION III—REMARKS

This Amendment is in response to the Office Action mailed December 16, 2003. Claims 1 and 10 are amended herein to more clearly recite the invention, and claims 20-37 are cancelled. New claims 38-51 are added. Claims 1-19 and 38-51 remain pending in the application. Applicants respectfully request reconsideration of the application and allowance of all pending claims in view of the above amendments and the following remarks.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 1-6 and 8-9 as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,309,915 to DiStefano (“DiStefano”) and also rejected claims 1 and 7 as anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,206,997 to Egitto (“Egitto”). Applicants respectfully traverse the Examiner’s rejections. A claim is anticipated only if each and every element, as set forth in the claim, is found in a single prior-art reference. MPEP § 2131; *Verdegaal Bros. v. Union Oil of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). As further explained below, DiStefano and Egitto cannot anticipate these claims because they do not disclose every element and limitation recited therein.

Claim 1 recites an apparatus combination including a die mounted on a substrate, the die being connected to the substrate by a plurality of wires and a mold cap encapsulating the die and the plurality of wires, the mold cap comprising an electrically insulating portion encapsulating the wires and at least part of the die, and “a thermally conductive portion encapsulating substantially all the electrically insulating portion and any part of the die not encapsulated by the electrically insulating portion.” Neither DiStefano nor Egitto can anticipate this claim because they do not disclose combinations including the recited limitations. DiStefano discloses a semiconductor chip partially encapsulated by an encapsulant 3 and partially covered by an adhesive 9. There is no disclosure or teaching that the adhesive 9 can function as an encapsulant or is thermally conductive and, moreover, the adhesive 9 and the encapsulant 3 cover mutually exclusive areas of the semiconductor chip. DiStefano therefore cannot disclose, teach or suggest a combination including “a thermally conductive portion encapsulating substantially all the electrically insulating portion and any part of the die not encapsulated by the electrically insulating portion.”

Similarly, Egitto discloses a semiconductor 30 covered by an overmold 60 consisting of a molded polymer. A heat sink 60 is mechanically connected to the overmold by an adherent material 80 placed on the exterior surface 70 of the overmold. Egitto does not disclose that the adherent material 80 is or can function as an encapsulant. Moreover, Egitto discloses that only enough material 80 should be applied as is needed to attach a heat sink. Egitto therefore cannot disclose, teach or suggest a combination including “a thermally conductive portion encapsulating substantially all the electrically insulating portion and any part of the die not encapsulated by the electrically insulating portion.” For the above reasons, Applicants submit that neither DiStefano nor Egitto can anticipate claims 1 and respectfully request withdrawal of the rejections and allowance of the claim.

Regarding claims 2-9, if an independent claim is allowable, then any claim depending therefrom is also allowable. *See, e.g.,* MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 1 is in condition for allowance. Applicants submit that claims 2-9 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

New claim 38 recites an apparatus combination including a die mounted on a substrate, the die being connected to the substrate by a plurality of wires, and a mold cap encapsulating the die and the plurality of wires, the mold cap comprising “an electrically insulating portion encapsulating substantially only the wires,” and “a thermally conductive portion encapsulating the die and the electrically insulating portion that encapsulates the wires.” Neither DiStefano nor Egitto discloses, teaches or suggests a combination including these limitations. Applicants submit that DiStefano and Egitto therefore cannot anticipate new claim 38 and respectfully request allowance of the claim.

Regarding new claims 39-43, if an independent claim is allowable, then any claim depending therefrom is also allowable. *See, e.g.,* MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 38 is in condition for allowance. Applicants submit that claims 39-43 are therefore allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request allowance of these claims.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 10-19 under 35 U.S.C § 103(a) as obvious in view of, and therefore unpatentable over DiStefano in view of U.S. Patent Application Publication No. 2003/0092205 to Wu (“Wu”). The Examiner concedes that DiStefano does not disclose a stacked die structure but alleges that Wu discloses such a structure, and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of DiStefano with a stacked structure as taught by Wu in to increased the devices in one package, since a stacked structure would provide more surface area.

Applicant respectfully traverses the Examiner’s rejections. To establish a *prima facie* case of obviousness, the Examiner must establish that three criteria are met: (1) the prior art references must teach or suggest all the claim limitations; (2) some suggestion or motivation to combine the references must be found in the prior art; and (3) there must be a reasonable expectation of success. MPEP § 2143. As explained below, the Examiner has not established a *prima facie* case of obviousness.

Claim 10 recites an apparatus combination including a stack of dies mounted on a substrate, the stack including a first die attached to the substrate and at least one additional die stacked thereon, a plurality of wires connecting at least one of the stacked dies to the substrate or to another die in the stack, and a mold cap encapsulating the wires and the plurality of stacked dies, the mold cap comprising an electrically insulating portion encapsulating the wires and at least part of the stacked dies, and “a thermally conductive portion encapsulating substantially all the electrically insulating portion and any part of the stacked dies not encapsulated by the electrically insulating portion.” As discussed above in connection with claim 1, DiStefano does not disclose, teach or suggest an apparatus combination including “a thermally conductive portion encapsulating substantially all the electrically insulating portion and any part of the stacked dies not encapsulated by the electrically insulating portion.” Wu also does not disclose a combination including these limitations. DiStefano and Wu, whether taken alone or combined, therefore cannot disclose every element and limitation of the claim, and cannot obviate the claim. Applicants therefore respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 11-19, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d

1071 (Fed. Cir. 1988). As discussed above, claim 10 is in condition for allowance. Applicants therefore respectfully submit that claims 11-19 are allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicant therefore respectfully requests withdrawal of the rejections and allowance of these claims.

New claim 44 recites an apparatus combination including a stack of dies mounted on a substrate, the stack including a first die attached to the substrate and at least one additional die stacked thereon, a plurality of wires connecting at least one of the stacked dies to the substrate or to another die in the stack, and a mold cap encapsulating the wires and the plurality of stacked dies, the mold cap comprising “an electrically insulating portion encapsulating substantially only the wires,” and “a thermally conductive portion encapsulating the plurality of stacked dies and the electrically insulating portion that encapsulates the wires.” As discussed above, DiStefano and Wu, whether taken alone or combined, do not disclose every element and limitation of the claim, and therefore cannot obviate the claim. Applicants therefore respectfully request allowance of the claim.

Regarding new claims 45-51, if an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 44 is in condition for allowance. Applicants therefore respectfully submit that claims 45-51 are allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request allowance of these claims.

Conclusion

Given the above amendments and accompanying remarks, all claims pending in the application are in condition for allowance. If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to allowance of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.


Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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Date: 3-16-04



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